CLAIMS

1. A multistage Stirling engine comprising:

a plurality of cylinders each internally holding a working fluid and provided with a displacer piston and a power piston disposed in series and fitted in the cylinder; a plurality of heaters respectively combined with the cylinders to heat the working fluid contained in the plurality of cylinders and using a high-temperature heating fluid provided by a heat source; and a heating fluid passage for passing the heating fluid sequentially through the heaters;

wherein a plurality of heat exchangers are provided which comprises the plurality of heaters, a plurality of coolers for cooling the working fluid within the plurality of cylinders, and a plurality of regenerators each interposed between one of the heaters and one of the coolers; each of the plurality of heaters is connected to one end of each of the plurality of cylinders; each of the plurality of coolers is connected to the other end of each of the plurality of cylinders; and the plurality of heat exchangers are interposed between adjacent ones of the plurality of cylinders.

2. The multistage Stirling engine according to claim 1, further comprising: output shafts connected to the displacer pistons and the power pistons fitted in the plurality of cylinders, a generator connected to the output shaft, and a case sealing the output shaft and the generator therein.

3. The multistage Stirling engine according to claim 2, wherein the multistage Stirling engine has an engine case and said case for sealing the output shaft and the generator is a part of the engine case.

4. The multistage Stirling engine according to claim 1, wherein the heating fluid is an exhaust gas discharged from an internal combustion engine, and said heating fluid passage includes an upstream exhaust pipe extending on opposite sides of one of the cylinders and connected to opposite side parts of a heater combined with a same cylinder.

5. The multistage Stirling engine according to claim 1, wherein said heating fluid passage includes a downstream exhaust pipe for carrying the exhaust gas after the exhaust gas has exchanged heat with the working fluid in one of the heaters, and the lower exhaust pipe extends on opposite sides of a cylinder adjacent to said one of the heaters and is connected to an exhaust manifold.

6. The multistage Stirling engine according to claim 1, wherein the plurality of cylinders are disposed parallel to each other.

7. The multistage Stirling engine according to claim 2, wherein the output shafts connected to the respective displacer pistons and power pistons of the plurality of cylinders are aligned, and the generator is installed in alignment with the axes of the output shafts.

8. The multistage Stirling engine according to claim 1, wherein the plurality of heat exchangers are united in a unit.